REMARKS

The present invention related to a human semaphorin protein. Claims 22-56 were pending in the application prior to the present Response. Claims 22-25, 35-37, and 41-56 were withdrawn from consideration as non-elected. Claims 27-28 and 30-31 are hereby cancelled by the Applicant. Claims 22-26, 29, and 32-56 are currently pending in the present application, out of which Claims 26, 29, 32-34 and 38-40 are under consideration. Reexamination and reconsideration of the application are requested in view of the current remarks.

Election/Restriction

Applicants respectfully acknowledge that Claims 22-25, 35-37, and 41-56 were withdrawn from consideration by the Examiner as non-elected.

Status of Application, Amendments, and/or Claims

Applicants respectfully acknowledge the Examiner's clarification that Claims 22-56 were pending in the application prior to the present Response.

Drawings

The Examiner objects to the drawings presented in Figures 4-5 and 7 because they include reference signs not mentioned in the description.

To overcome the objection to Figures 5, and in accordance with the Examiner's recommendation, Applicants amended the specification to include reference signs A-C into the description of the drawings. Support for the amendment is found in Example 4, on page 10, lines 6-9, of the specification, wherein panels A-C of Figure 5 are clearly explained. These amendments do not introduce any new matter and are for clarification purposes only.

Applicants respectfully submit that the references to the signs denoting panels A-G of Figure 4, and to the signs denoting panels A-B of Figure 7 were present in the specification

at the time of filing of the present application. A reference to panels A-G of Figure 4 is in Example 3, on page 9, lines 14-20, of the specification. A reference to panels A-B of Figure 7 is on page 7, lines 9-19 of the specification. Applicants amended the specification to further clarify the references to the different panels of Figures 4 and 7. Support for the amendments is found as indicated above. These amendments do not introduce any new matter.

In view of the amendments and the remarks, Applicants respectfully request withdrawal of the rejection.

Sequence Rules

The Examiner asserts that the present application fails to comply with the requirements of 37 C.F.R. §1.821 through §1.825 by disclosing an amino acid sequence in Figures 1-2 and 6 without the accompanying SEQ ID NOs. The Examiner requires correction of the application.

Applicants note that the sequences depicted in Figure 6 have not previously been assigned SEQ ID NOs. Therefore, Applicants assigned SEQ ID NOs to the sequences represented in Figure 6 and amended the specification and the sequence listing accordingly. The amendment does not introduce new matter.

Applicants provide herewith a substitute *Sequence Listing* and request that it be substituted (pages 1 through 25) for the *Sequence Listing* behind the *Abstract* of the application. This *Sequence Listing* is a substitute paper copy which comprises the nucleotide and amino acid sequences contained in the application as originally filed. Applicants also submit a substitute *Computer Readable Form of the Sequence Listing*. Pursuant to 37 C.F.R. § 1.821(e) and (f), the *Sequence Listing* contained in the paper copy as well as the *Computer Readable Form* contains no new subject matter and the paper copy and the *Computer Readable Form* are the same.

Applicants respectfully request the Examiner's approval of the amendments to Figures 1-2 and 6 that incorporate appropriate SEQ ID NOs into the figures as follows: SEQ ID NO:1 into Figure 1; SEQ ID NO:6 and SEQ ID NO:7 into Figure 2, and SEQ ID NO:8 and SEQ ID NO:9 into Figure 6. The amendments are shown in red in compliance with 37 CFR 1.121(d) and do not introduce any new matter.

In view of the foregoing, Applicants respectfully assert that the Examiner's objection regarding lack of compliance with the requirements of 37 C.F.R. §1.821 through §1.825 has been overcome. Applicants request withdrawal of the objection.

Claim Objections

The Examiner objects to Claim 34 because it depends on the non-elected Claim 22, currently withdrawn from consideration. To overcome the objection, the Applicants amended Claim 34 by converting it into an independent claim. Applicants respectfully assert that the amendment overcomes the objection and request withdrawal of the objection.

The Examiner objects to Claims 38-39, asserting that both claims depend from rejected claims. Applicants respectfully assert that rejections of Claims 32 and 33 are obviated elsewhere in the present Response, thereby rendering moot the objections to Claims 38-39. Applicants respectfully request withdrawal of the objection.

Claim Rejections under 35 U.S.C. §101

The Examiner rejects Claims 26-34 under 35 U.S.C. §101, asserting that the invention as claimed in rejected Claims 26-34 is directed to non-statutory subject matter, "a protein." To overcome the objection, the Examiner recommends amending the claims to recite "an isolated protein" or "a substantially purified protein."

In this Response, Applicants cancel Claims 27-28 and 30-31, thereby rendering moot the rejections of these claims under 35 U.S.C. §101. To overcome the rejection of Claims 26, 29, and 32-34 under 35 U.S.C. §101, and in accordance with the Examiner's

recommendation, Applicants amended Claims 26, 29, and 32-34 to recite "an isolated protein." Support for the amendment is found throughout the specification. These amendments do not introduce any new matter.

Applicants respectfully assert that the amendments obviate the rejections under 35 U.S.C. §101 and request withdrawal of the rejections.

Claim Rejections under 35 U.S.C. §112

Claim Rejections under 35 U.S.C. §112, first paragraph.

The Examiner rejects Claims 27-28, 30-31, 34 and 40 under 35 U.S.C. §112, first paragraph for reasons of enablement. The Examiner further rejects Claims 27-28 and 30-31 under 35 U.S.C. §112, first paragraph, for reasons of insufficient written description.

In this Response, Applicants cancel Claims 27-28 and 30-31, thereby rendering moot the rejections of these claims. Applicants amended Claim 34 to overcome the Examiner's objection to this claim (see *Claim Objections*). Applicants respectfully assert that the amendment of Claim 34 to overcome the Examiner's objection to this claim rendered moot the rejection of Claim 34, and its dependent Claim 40, under 35 U.S.C. §112, first paragraph.

In view of the foregoing, Applicants respectfully assert that rejections of Claims 27-28, 30-31, 34 and 40 under 35 U.S.C. §112, first paragraph, are rendered moot. Applicants respectfully request withdrawal of the rejections under 35 U.S.C. §112, first paragraph.

Claim Rejections under 35 U.S.C. §112, second paragraph

The Examiner rejects Claims 27-28 and 30-31 under 35 U.S.C. §112, second paragraph as indefinite. As noted above, in this Response, Applicants cancel Claims 27-28 and 30-31, thereby rendering moot the rejections of these claims under 35 U.S.C. §112, second paragraph. Applicants respectfully request withdrawal of the rejection.

Claim Rejections under 35 U.S.C. §102(b)

The Examiner rejects Claims 26-27, 29-30, 34, and 40 under 35 U.S.C. §102(b) as anticipated by an International Patent Application PCT/US97/2330 (International Publication No. WO 98/27205) to Jacobs, *et al.*, filed December 17, 1997, and hereinafter referred to as *Jacobs, et al.* The Examiner asserts that *Jacobs, et al.* teaches a protein encoded by a nucleic acid sharing 88.8% sequence homology with SEQ ID NO:1. The Examiner also asserts that *Jacobs, et al.* teaches a protein encoded by a nucleic acid that shares 100% sequence homology with SEQ ID NO:3 for a fragment comprising base pairs 1 through 216. In addition, the Examiner asserts that *Jacobs, et al.* teaches a protein encoded by a nucleic acid that shares 100% sequence homology with SEQ ID NO:3 in the fragment comprising base pairs 1 through 216, and, therefore, identical to the protein encoded by SEQ ID NO:1.

As noted above, in this Response, Applicants cancel Claims 27 and 30, thereby rendering moot the rejections of these claims under 35 U.S.C. §102(b).

Applicants respectfully traverse the rejection of Claims 26, 29, 34 and 40. Applicants respectfully assert that *Jacobs, et al.* does not anticipate the present invention as claimed in Claims 26, 29, 34 and 40. Specifically, *Jacobs, et al.* does not teach proteins of Claims 26, 29, 34 and 40, comprising: proteins encoded by SEQ ID NO:1 or SEQ ID NO:3; proteins encoded by sequences corresponding to SEQ ID NO:1 or SEQ ID NO:3 within the degeneration of the genetic code; or sequences, which hybridize with SEQ ID NO:1 or SEQ ID NO:3 under stringent conditions.

Applicants respectfully bring to the Examiner's attention that SEQ ID NO:7 of *Jacobs, et al.* (disclosed on pages 69-71 of *Jacobs, et al.* and referred hereinafter as "the *Jacobs, et al.* sequence") differs significantly from SEQ ID NO:1 of the present application. Specifically, beginning from base pair 1731 of SEQ ID NO:1 of the present application, which aligns with base pair 1855 of the *Jacobs, et al.* sequence, and for the rest of the length of the coding region of SEQ ID NO:1, ending at approximately base pair 3090, the two

sequences are very different, and are not homologous, or analogous, or similar within the degeneration of the genetic code. Therefore, the *Jacobs, et al.* sequence does not encode a protein comprising a protein encoded by SEQ ID NO:1, a sequence corresponding to SEQ ID NO:1 within the degeneration of the genetic code, or a sequence which hybridizes with SEQ ID NO:1 under stringent conditions.

Moreover, SEQ ID NO:3 of the present application is a fragment of SEQ ID NO:1 between the base pairs 2875 and 3090, thereby falling into the region of SEQ ID NO:1 that bears no similarity to the *Jacobs, et al.* sequence. Therefore, the *Jacobs, et al.* sequence does not encode a protein comprising a protein encoded by SEQ ID NO:3, a sequence corresponding to SEQ ID NO:3 within the degeneration of the genetic code, or a sequence which hybridizes with SEQ ID NO:3 under stringent conditions.

In view of the foregoing, Applicants respectfully assert that *Jacobs, et al.* does not teach the nucleotide sequences of the present invention or nucleotide sequences encoding proteins of the present invention, and that *Jacobs, et al.* does not anticipate the present invention as claimed in Claims 26, 29, 34 and 40.

In view of the foregoing remarks, Applicants respectfully request the Examiner to withdraw claim rejections under 35 U.S.C. §102(b).

Claims Free of Art

Applicants respectfully acknowledge that Claims 26, 29, 32-33 and 38-39 were rendered free of art by the Examiner.

CONCLUSION

Applicants respectfully assert that the claims are now in condition for allowance and request that the application be passed to issuance. If the Examiner believes that any informalities that may be corrected by Examiner's amendment remain in the case, or if there are any other issues which can be resolved by a telephone interview, a telephone call to the undersigned agent at (404) 815-6102 is respectfully solicited.

No additional fees are believed due, however, the Commissioner is hereby authorized to charge any deficiencies which may be required or credit any overpayment to Deposit Account Number 11-0855.

Respectfully submitted,

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Fig. 1 SEQ ID NO:1

```
5`-ATGAGGTCAGAAGCCTTGCTGCTATATTTCACACTGCTACACTTTGCTGG      50
   GGCTGGTTTCCCAGAAGATTCTGAGCCAATCAGTATTTCGCATGGCAACT     100
   ATACAAAACAGTATCCGGTGTTTGTGGGCCACAAGCCAGGACGGAACACC     150
   ACACAGAGGCACAGGCTGGACATCCAGATGATTATGATCATGAACGGAAC     200
   CCTCTACATTGCTGCTAGGGACCATATTTATACTGTTGATATAGACACAT     250
   CACACACGGAAGAAATTTATTGTAGCAAAAAACTGACATGGAAATCTAGA     300
   CAGGCCGATGTAGACACATGCAGAATGAAGGGAAAACATAAGGATGAGTG     350
   CCACAACTTTATTAAAGTTCTTCTAAAGAAAAACGATGATGCATTGTTTG     400
   TCTGTGGAACTAATGCCTTCAACCCTTCCTGCAGAAACTATAAGATGGAT     450
   ACATTGGAACCATTCGGGGATGAATTCAGCGGAATGGCCAGATGCCCATA     500
   TGATGCCAAACATGCCAACGTTGCACTGTTTGCAGATGGAAAACTATACT     550
   CAGCCACAGTGACTGACTTCCTTGCCATTGACGCAGTCATTTACCGGAGT     600
   CTTGGAGAAAGCCCTACCCTGCGGACCGTCAAGCACGATTCAAAATGGTT     650
   GAAAGAACCATACTTTGTTCAAGCCGTGGATTACGGAGATTATATCTACT     700
   TCTTCTTCAGGGAAATAGCAGTGGAGTATAACACCATGGGAAAGGTAGTT     750
   TTCCCAAGAGTGGCTCAGGTTTGTAAGAATGATATGGGAGGATCTCAAAG     800
   AGTCCTGGAGAAACAGTGGACGTCGTTCCTGAAGGCGCGCTTGAACTGCT     850
   CAGTTCCTGGAGACTCTCATTTTTATTTCAACATTCTCCAGGCAGTTACA     900
   GATGTGATTCGTATCAACGGGCGTGATGTTGTCCTGGCAACGTTTTCTAC     950
   ACCTTATAACAGCATCCCTGGGTCTGCAGTCTGTGCCTATGACATGCTTG    1000
   ACATTGCCAGTGTTTTTACTGGGAGATTCAAGGAACAGAAGTCTCCTGAT    1050
   TCCACCTGGACACCAGTTCCTGATGAACGAGTTCCTAAGCCCAGGCCAGG    1100
   TTGCTGTGCTGGCTCATCCTCCTTAGAAAGATATGCAACCTCCAATGAGT    1150
   TCCCTGATGATACCCTGAACTTCATCAAGACGCACCCGCTCATGGATGAG    1200
   GCAGTGCCCTCCATCTTCAACAGGCCATGGTTCCTGAGAACAATGGTCAG    1250
   ATACCGCCTTACCAAAATTGCAGTGGACACAGCTGCTGGGCCATATCAGA    1300
   ATCACACTGTGGTTTTTCTGGGATCAGAGAAGGGAATCATCTTGAAGTTT    1350
   TTGGCCAGAATAGGAAATAGTGGTTTTCTAAATGACAGCCTTTTCCTGGA    1400
   GGAGATGAGTGTTTACAACTCTGAAAAATGCAGCTATGATGGAGTCGAAG    1450
   ACAAAAGGATCATGGGCATGCAGCTGGACAGAGCAAGCAGCTCTCTGTAT    1500
   GTTGCGTTCTCTACCTGTGTGATAAAGGTTCCCCTTGGCCGGTGTGAACG    1550
   ACATGGGAAGTGTAAAAAAACCTGTATTGCCTCCAGAGACCCATATTGTG    1600
   GATGGATAAAGGAAGGTGGTGCCTGCAGCCATTTATCACCCAACAGCAGA    1650
```

Fig. 2 SEQ ID NO:6 AND SEQ ID NO:7

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   ggcacgaggctgcagccaactccgctccccgcgcactcggctgcccaggcgctcgga     57
acccagcagcggcgctcctccgcggtgccggtcgcccgcgatgcccgcttagcagcgtgt    117
agcagcggccagcatcaccacacccgcggcaccgcgctgccggccgcagagccgggccag    177
agccttgccccctcccccagcccccaccccgcccccgccctgaaatgacttgttaatc      237
ggcgcagacaccaccaaggggactcaccgaagtggaatccaagtggaatttggatttgga    297
gaagagtttcttgaacatttaccctcttccttgttggttttcttttttcttttttcttctttt 357
tttttttggcttcttttttcctctcccctttctccgctcgtcattggagatgaacacatc    417
gcgtttgcatcccagaaagtagtcgccgcgactatttcccccaaagagacaagcacacat    477
gtaggaatgacaaaggcttgcgaaggagagagccgcagccgcggcccggagagatcccct    537
cgataatggattactaaatgggatacacgctgtaccagttcgctccgagccccggccgcc    597
tgtccgtcgatgcaccgaaaagggtgaagtagagaaataaagtctccccgctgaactact    657

ATGAGGTCAGAAGCCTTGCTGCTATATTTCACACTGCTACACTTTGCTGGGGCTGGTTTC    717
 M  R  S  E  A  L  L  L  Y  F  T  L  L  H  F  A  G  A  G  F
CCAGAAGATTCTGAGCCAATCAGTATTTCGCATGGCAACTATACAAAACAGTATCCGGTG    777
 P  E  D  S  E  P  I  S  I  S  H  G  N  Y  T  K  Q  Y  P  V
TTTGTGGGCCACAAGCCAGGACGGAACACCACACAGAGGCACAGGCTGGACATCCAGATG    837
 F  V  G  H  K  P  G  R  N  T  T  Q  R  H  R  L  D  I  Q  M
ATTATGATCATGAACGGAACCCTCTACATTGCTGCTAGGGACCATATTTATACTGTTGAT    897
 I  M  I  M  N  G  T  L  Y  I  A  A  R  D  H  I  Y  T  V  D
ATAGACACATCACACACGGAAGAAATTTATTGTAGCAAAAAACTGACATGGAAATCTAGA    957
 I  D  T  S  H  T  E  E  I  Y  C  S  K  K  L  T  W  K  S  R
CAGGCCGATGTAGACACATGCAGAATGAAGGGAAAACATAAGGATGAGTGCCACAACTTT   1017
 Q  A  D  V  D  T  C  R  M  K  G  K  H  K  D  E  C  H  N  F
ATTAAAGTTCTTCTAAAGAAAAACGATGATGCATTGTTTGTCTGTGGAACTAATGCCTTC   1077
 I  K  V  L  L  K  K  N  D  D  A  L  F  V  C  G  T  N  A  F
AACCCTTCCTGCAGAAACTATAAGATGGATACATTGGAACCATTCGGGGATGAATTCAGC   1137
 N  P  S  C  R  N  Y  K  M  D  T  L  E  P  F  G  D  E  F  S
GGAATGGCCAGATGCCCATATGATGCCAAACATGCCAACGTTGCACTGTTTGCAGATGGA   1197
 G  M  A  R  C  P  Y  D  A  K  H  A  N  V  A  L  F  A  D  G
AAACTATACTCAGCCACAGTGACTGACTTCCTTGCCATTGACGCAGTCATTTACCGGAGT   1237
 K  L  Y  S  A  T  V  T  D  F  L  A  I  D  A  V  I  Y  R  S
CTTGGAGAAAGCCCTACCCTGCGGACCGTCAAGCACGATTCAAAATGGTTGAAAGAACCA   1297
 L  G  E  S  P  T  L  R  T  V  K  H  D  S  K  W  L  K  E  P
TACTTTGTTCAAGCCGTGGATTACGGAGATTATATCTACTTCTTCTTCAGGGAAATAGCA   1357
 Y  F  V  Q  A  V  D  Y  G  D  Y  I  Y  F  F  F  R  E  I  A
GTGGAGTATAACACCATGGGAAAGGTAGTTTTCCCAAGAGTGGCTCAGGTTTGTAAGAAT   1417
 V  E  Y  N  T  M  G  K  V  V  F  P  R  V  A  Q  V  C  K  N
GATATGGGAGGATCTCAAAGAGTCCTGGAGAAACAGTGGACGTCGTTCCTGAAGGCGCGC   1477
 D  M  G  G  S  Q  R  V  L  E  K  Q  W  T  S  F  L  K  A  R
TTGAACTGCTCAGTTCCTGGAGACTCTCATTTTTATTTCAACATTCTCCAGGCAGTTACA   1537
 L  N  C  S  V  P  G  D  S  H  F  Y  F  N  I  L  Q  A  V  T
GATGTGATTCGTATCAACGGGCGTGATGTTGTCCTGGCAACGTTTTCTACACCTTATAAC   1597
 D  V  I  R  I  N  G  R  D  V  V  L  A  T  F  S  T  P  Y  N
AGCATCCCTGGGTCTGCAGTCTGTGCCTATGACATGCTTGACATTGCCAGTGTTTTTACT   1657
 S  I  P  G  S  A  V  C  A  Y  D  M  L  D  I  A  S  V  F  T
```

Fig. 6

Sequence-Alignment: SEMA6A-1 / Zyxin

```
SEMA6A-1                                                    SEQ ID NO:8 (6a)
PPPAPQRVDSIQVHSSQPSGQAVTVSRQPSLNAYNSLTRSGLKRTPSLKPD-VPPKPSFAPLSTSMKPNDACT
* * ***   +* *  **  +   *  ** +++ *+  *  * + *+  *   *  * * *+ +   *
PPPQPQRKPQVQLH-VQPQAKP-HVQPQP-VSSANTQPRGPLSQAPTPAPKFAPVAPKFTPVVSKFSP
zyxin                                                       SEQ ID NO:9 (6b)
```

Identity: 33%
Similarity: 49%